IN THE CLAIMS

Claims 1-28.   (Canceled).

29.   (**Currently Amended**) A machine-implemented method**, comprising:** ~~for multiplying a matrix [A] by a matrix of inputs [X] to obtain a matrix of outputs [Y], the method comprising:~~

receiving a multimedia signal having data values;

forming the data values into a matrix of inputs [X];

forming **a matrix** [A] ~~as a matrix~~ of predetermined values and multiplication operations~~, wherein the multiplication operations are selectively positioned into pairs within [A] to reduce the number of the multiplication operations upon factorization of [A]~~;

factoring [A] into a butterfly matrix [B], a shuffle matrix [S], and a multiplication matrix [M]**, wherein the multiplication operations are selectively positioned into pairs within [M]; and**

~~grouping a set of values together within [M] for simultaneous execution by a processor instruction;~~

~~simultaneously~~ executing ~~multiplication operations on the grouped set of values using~~ a Single Instruction Multiple Data (SIMD) instruction **that multiplies [X], [B], [S], and [M] together to obtain a matrix of outputs [Y]**.

30.   (Previously Presented) The machine-implemented method of claim 29, wherein the SIMD instruction is a Packed Multiply and Add (PMADDWD) instruction.

31.   (Previously Presented) The machine-implemented method of 30, wherein values within [B] and [S] are integers selected from the group consisting of 1, 0 and –1.

32.   (Previously Presented) The machine-implemented method of claim 31, wherein [A] is a 4-point Discrete Cosine Transform (DCT) transformation matrix, [X] represents a time domain of a video signal, and [Y] represents a frequency domain of the video signal.

33. (Previously Presented) The machine-implemented method of claim 32, wherein the multiplication matrix [M] is

$$
\begin{bmatrix}
\dfrac{1}{\sqrt{2}} & \dfrac{1}{\sqrt{2}} & 0 & 0 \\[2ex]
\dfrac{1}{\sqrt{2}} & -\dfrac{1}{\sqrt{2}} & 0 & 0 \\[2ex]
0 & 0 & \cos(\dfrac{3\pi}{8}) & \cos(\dfrac{\pi}{8}) \\[2ex]
0 & 0 & -\cos(\dfrac{\pi}{8}) & \cos(\dfrac{3\pi}{8})
\end{bmatrix} ,
$$

and wherein the ~~grouped set of values~~ **positioned pairs** are $\begin{matrix} \dfrac{1}{\sqrt{2}} \\[2ex] \dfrac{1}{\sqrt{2}} \end{matrix}$ and $\begin{matrix} \dfrac{1}{\sqrt{2}} \\[2ex] -\dfrac{1}{\sqrt{2}} \end{matrix}$.

34. (Previously Presented) A machine-readable medium having instructions to cause a machine to perform a machine-implemented method**,** ~~for multiplying a matrix [A] by a matrix of inputs [X] to obtain a matrix of outputs [Y], the method~~ comprising:

receiving a multimedia signal having data values;

forming the data values into a matrix of inputs [X];

forming **a matrix** [A] ~~as a matrix~~ of predetermined values and multiplication operations~~, wherein the multiplication operations are selectively positioned into pairs within [A] to reduce the number of the multiplication operations upon factorization of [A]~~;

factoring [A] into a butterfly matrix [B], a shuffle matrix [S], and a multiplication matrix [M]**, wherein the multiplication operations are selectively positioned into pairs within [M]**; **and**

~~grouping a set of values together within [M] for simultaneous execution by a processor instruction;~~

~~simultaneously~~ executing ~~multiplication operations on the grouped set of values using~~ a Single Instruction Multiple Data (SIMD) instruction **that multiplies [X], [B], [S], and [M] together to obtain a matrix of outputs [Y]**.

35. (Previously Presented) The machine-readable medium of claim 34, wherein the SIMD instruction is a Packed Multiply and Add (PMADDWD) instruction.

36. (Previously Presented) The machine-readable medium of claim 35, wherein values within [B] and [S] are integers selected from the group consisting of 1, 0 and –1.

37. (Previously Presented) The machine-readable medium of claim 36, wherein [A] is a 4-point Discrete Cosine Transform (DCT) transformation matrix, [X] represents a time domain of a video signal, and [Y] represents a frequency domain of the video signal.

38. (Previously Presented) The machine-readable medium of claim 37, wherein the multiplication matrix [M] is

$$
\begin{bmatrix}
\dfrac{1}{\sqrt{2}} & \dfrac{1}{\sqrt{2}} & 0 & 0 \\
\dfrac{1}{\sqrt{2}} & -\dfrac{1}{\sqrt{2}} & 0 & 0 \\
0 & 0 & \cos(\dfrac{3\pi}{8}) & \cos(\dfrac{\pi}{8}) \\
0 & 0 & -\cos(\dfrac{\pi}{8}) & \cos(\dfrac{3\pi}{8})
\end{bmatrix} ,
$$

and wherein the ~~grouped set of values~~ **positioned pairs** are $\begin{matrix} \frac{1}{\sqrt{2}} \\ \frac{1}{\sqrt{2}} \end{matrix}$ and $\begin{matrix} \frac{1}{\sqrt{2}} \\ -\frac{1}{\sqrt{2}} \end{matrix}$.

39. (Previously Presented) A system comprising:

a processing unit coupled to a memory through a bus; and

a process ~~for multiplying a matrix [A] by a matrix of inputs [X] to obtain a matrix of outputs [Y], the process~~ executed from the memory by the processing unit to cause the processing unit to:

receive a multimedia signal having data values;

form the data values into a matrix of inputs [X];

form **a matrix** [A] ~~as a matrix~~ of predetermined values and multiplication operations, ~~wherein the multiplication operations are selectively positioned into pairs within [A] to reduce the number of the multiplication operations upon factorization of [A]~~;

factor [A] into a butterfly matrix [B], a shuffle matrix [S], and a multiplication matrix [M]**, wherein the multiplication operations are selectively positioned into pairs within [M]; and**

~~group a set of values together within [M] for simultaneous execution by a processor instruction;~~

~~simultaneously~~ execute ~~multiplication operations on the grouped set of values using~~ a Single Instruction Multiple Data (SIMD) instruction **that multiplies [X], [B], [S], and [M] together to obtain a matrix of outputs [Y]**.

40.   (Previously Presented) The system of claim 39, wherein the SIMD instruction is a Packed Multiply and Add (PMADDWD) instruction.

41.   (Previously Presented) The system of claim 40, wherein values within [B] and [S] are integers selected from the group consisting of 1, 0 and −1.

42.   (Previously Presented) The system of claim 41, wherein [A] is a 4-point Discrete Cosine Transform (DCT) transformation matrix, [X] represents a time domain of a video signal, and [Y] represents a frequency domain of the video signal.

43.   (Previously Presented) The system of claim 42, wherein the multiplication matrix [M] is

$$\begin{bmatrix} \dfrac{1}{\sqrt{2}} & \dfrac{1}{\sqrt{2}} & 0 & 0 \\[2mm] \dfrac{1}{\sqrt{2}} & -\dfrac{1}{\sqrt{2}} & 0 & 0 \\[2mm] 0 & 0 & \cos(\dfrac{3\pi}{8}) & \cos(\dfrac{\pi}{8}) \\[2mm] 0 & 0 & -\cos(\dfrac{\pi}{8}) & \cos(\dfrac{3\pi}{8}) \end{bmatrix},$$

and wherein the ~~grouped set of values~~ **positioned pairs** are $\dfrac{1}{\sqrt{2}}$ and $\dfrac{1}{\sqrt{2}}$.

$$\dfrac{1}{\sqrt{2}} \qquad -\dfrac{1}{\sqrt{2}}$$